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(54) **Spinal traction device**

(57) A spinal traction device has upper and lower belts (10, 12) which will be secured about axially spaced regions of a subject's torso and a number of bracing units (22) each unit being resiliently extendable as by a compression spring (28). The units are secured in compression between the belts in use so as to exert continuous dynamic traction force on a zone of the subject's spinal column between the belts in wear. The number and units and their positioning about the belts may be selected as required and individual fine adjustment of the force supplied by each unit may be effected by a screw adjustment device (32).

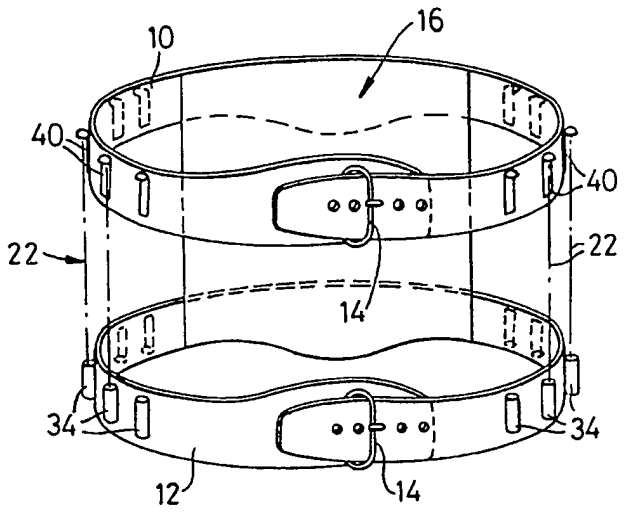

Fig. 1

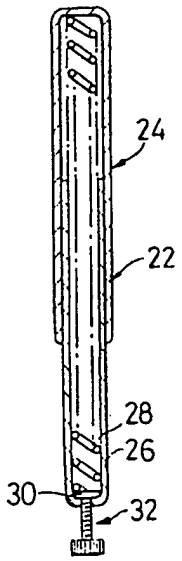

Fig. 3

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.
The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.

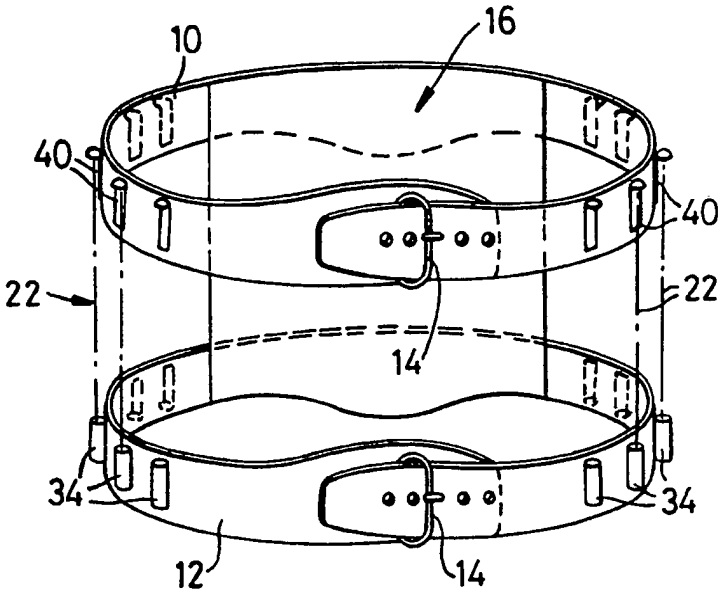

Fig. 1

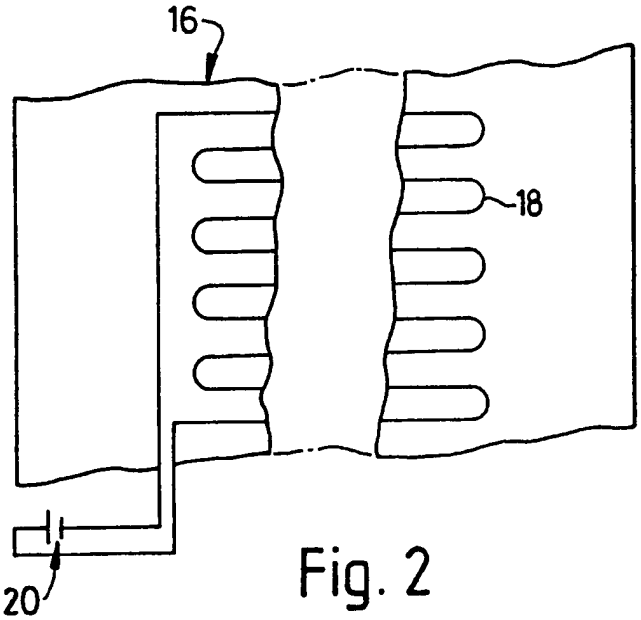

Fig. 2

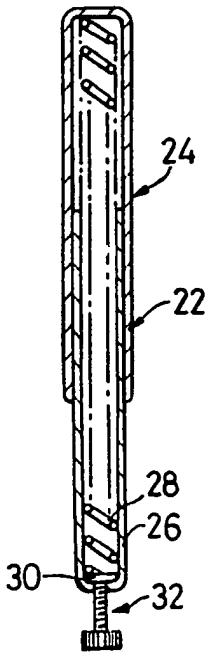

Fig. 3

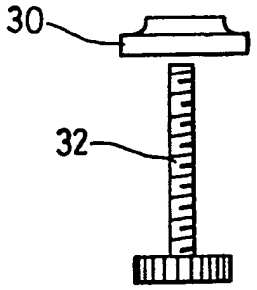

Fig. 4

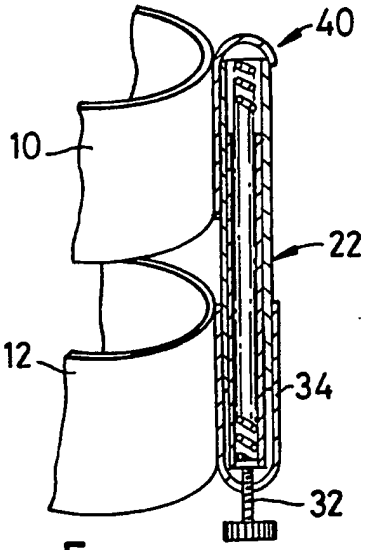

Fig. 5

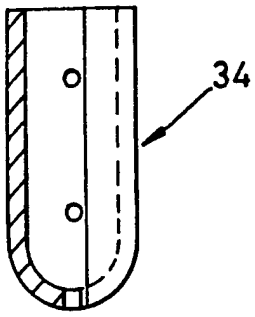

Fig. 6

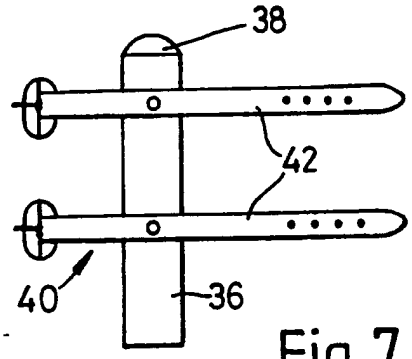

Fig. 7

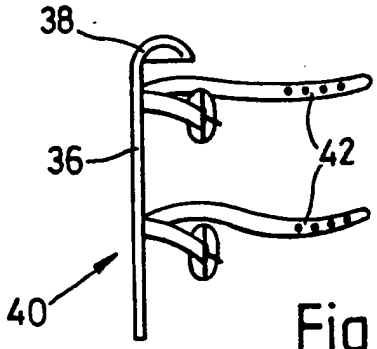

Fig. 8

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SPINAL TRACTION DEVICE

This invention relates to devices for exerting traction forces on a subject's spinal column for the non-operative treatment or relief of various back conditions, particularly prolapsed intervertebral discs. It is also contemplated that the device could be adapted for use in the management of pathological spinal curvatures such as antero-posterior kyphoses or lateral scolioses.

Many productive man-days are lost each year due to problems of the back. Various forms of orthopaedic treatment are available for the management of these conditions such as the use of physiotherapy and the application of orthotic appliances. Sciatica is a particularly common complaint which in the vast majority of cases is caused by the lateral prolapse of an intervertebral disc. The disc, usually between the lumbar vertebrae 4 and 5, compresses the roots of the sciatic nerve and this results in the sensation of acute pain along the line of distribution of the sciatic nerve through the gluteal region, the back of the thigh and leg and the sole of the foot. The use of heat and traction have been shown to be effective in the non-operative treatment of intervertebral discs.

Most known types of traction devices are bulky and expensive and of limited availability. Demand for treatment is high, thus patients often have to undergo prolonged courses of non-continuous treatment so that progress is painfully slow and the good effect of a treatment session may be destroyed by activities undertaken by the subject between sessions.

The object of the invention is to provide a particularly effective yet inexpensive and simple traction device which can be worn continuously if need be without undue interference with the subject's mobility or range of activities, which is adaptable in providing ready control of the traction forces applied, and which can be fitted, used and adjusted by the subject or his or

her relatives or helpers e.g. in the home, without specialist assistance.

According to the invention there is provided a spinal traction device including first and second belts to be operatively secured about spaced regions of a subject's torso, and a plurality of resiliently extendable bracing units operatively secured in compression between the belts so as to exert continuous dynamic traction force on a zone of the subject's spinal column between the belts in wear.

Preferably the belts are adapted to accommodate a variable number of bracing units at angularly spaced locations around the torso in use, and the resilient loading of each individual unit is preferably also adjustable; whereby the total traction force exerted by the device can be selectively varied over a wide range of fine adjustment to best suit the needs of the subject and the conditions under which the device is being worn, for example less tractive force may be desirable when the subject is resting and more when he or she is sitting upright, standing or walking.

Moreover these latter features permit not only uniform axial stretching of the zone of the spinal column but also biased stretching of various degrees if required e.g. to correct bending or twisting of the spinal column.

The device may further include one or more heating pads or other heating means for applying warmth to the spinal or other zones in wear.

An example of the invention is more particularly described with reference to the accompanying drawings wherein

Figure 1 is a perspective diagram of a spinal traction device,

Figure 2 is a diagram of an electrical heating pad of the device,

Figure 3 is a longitudinal section of a bracing unit of the device,

Figure 4 is a detail of a tension adjuster of said bracing unit,

Figure 5 is a sectional view showing a bracing unit mounted in its position of use on belts of the device,

Figure 6 is a detail of a lower bracing unit mounting of the device, and

Figures 7 and 8 are respectively front and side views of upper bracing unit mountings of the device.

The device shown comprises upper and lower belts 10,12 which can be releasably secured as by buckles 14 firmly about axially spaced regions of the subject's torso.

In this particular example the portions of the belts which will abut the lumbar region carry a flexible heating pad 16 shown in greater detail in Figure 2 incorporating one or more flexible electrical heater elements 18 connected in known manner to an electrical power source. Conveniently the heater pad is arranged to operate from either a main supply or from a battery power pack 20 (possibly rechargeable) which can be carried on the subject's person.

The device further includes a number of bracing units 22 whose operative positioning for this example is shown by broken lines in Figure 1, the construction of the individual units being shown in greater detail in Figures 3-5.

Each unit 22 comprises a pair of telescopically engaged tubes 24,26 containing a compression spring 28 resiliently urging the opposite ends of the unit away from each other. The operatively upper end of spring 28 seats against the closed end of the upper and outer tube 24; its lower end seats against a disc 30 located within the lower end of tube 26 and adjustable therealong by a screw 32 in threaded engagement with and extending downwardly from the lower end of said tube.

The lower belt 12 has a number of upwardly directed lower mountings 34 attached to its outer periphery the

mounting may be disposed in various manners around the belt, in this particular example two groups of five mountings are spaced equi-angularly around opposing side segments of the belt. Each mounting 34, shown in greater detail in Figure 6, is a cup like member providing a socket into which the lower end of a respective bracing unit 22 can be fitted, an opening in the base of the socket providing clearance for the respective adjusting screw 32.

The upper belt 10 carries upper mountings 40 positioned to correspond to lower mountings 34, these upper mountings are shown in greater detail in Figures 7 and 8 and comprise an operatively vertical plate 36 fixed to belt 10 with an outwardly projecting locating lug 38 at its upper end which is dished to provide abutment for the upper end of the associated bracing unit, the unit being finally secured in place between the belts by means of a pair of short straps 42 which also help to keep the unit upright and in correct alignment with the belts.

The operative spacing of belts 10 and 12 is such that each unit has to be compressed for its location therebetween thus the units will exert continuous dynamic traction force acting through the belts to the zone of the subject's spinal column between the belts in wear. The number of bracing units 22 used can be varied according to choice and fine and localised adjustment of the traction force or forces can be made by the use of the adjusting screws 32. It is possible to set up the units to provide a greater traction force on one side or the other or otherwise localised around the belts and the units can be readily mounted or dismounted as required by the subject or, if the subject cannot manage this, by a relative or other assistant.

The traction device is compact and light in weight and thus can be worn for prolonged periods even by an active subject. It is inexpensive to provide and thus within the means of many sufferers to purchase outright for use at will. From preliminary trials it is believed that frequent and prolonged use of the device of the

invention will provide substantial relief of pain, drastic reduction in recovery time, and may possibly avoid the need for surgical treatment of some conditions which would otherwise be necessary. Further relief is obtained by the use of the heater pad on the affected area, thus providing heat and traction simultaneously to expedite recovery.

The ability to bias the tractive loading between the belts by the positioning and adjustment of the bracing units can be used to restrain bending of the spinal column e.g. from back to front (kyphosis) and/or from side to side (scoliosis). For the treatment of these latter conditions the upper belt 10 will be worn higher up the subject's torso (under the armpits) and longer bracing units will be secured in selected mountings of the belts for the application of traction force which is biased to counteract the bending.

Due to the reactive tensioning of the bracing units the spinal column is put under tension and this tensile force aids prolapsed intervertebral discs to regain their position. Pressure on the sciatic nerve is reduced and eventually relieved and consequently back pain is eliminated.

CLAIMS

1. A spinal traction device including first and second belts to be operatively secured about spaced regions of a subject's torso, and a plurality of resiliently extendable bracing units operatively secured in compression between the belts so as to exert continuous dynamic traction force on a zone of the subject's spinal column between the belts in wear.

2. A device as in Claim 1 wherein the belts are adapted to accommodate a variable number of bracing units at angularly spaced locations around the subject's torso in use.

3. A device as in Claim 1 or 2 wherein each said unit is individually adjustable to regulate the resilient force exerted thereby.

4. A device as in any preceding claim wherein each said unit comprises a pair of telescopically engaged tubes containing a compression spring resiliently urging the opposite ends away from each other.

5. A device as in Claim 4 wherein each said unit includes an abutment against which one end of said spring acts, the operative position of said abutment being selectively adjustable by means of a threaded element.

6. A device as in any preceding claim including heating means for applying warmth to the spinal or other zone of the subject's body in use.

7. A spinal traction device substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

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